

FORM PTO-1390 (Modified)  
(REV 10-95)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

**TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371**

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR  
**09/831862**

INTERNATIONAL APPLICATION NO.  
**PCT/DE 00/02635**INTERNATIONAL FILING DATE  
**08/08/2000**PRIORITY DATE CLAIMED  
**SEPTEMBER 17, 1999**TITLE OF INVENTION  
**ELECTRICAL MACHINE**

APPLICANT(S) FOR DO/EO/US

**Gerhard PFLUEGER, Thomas LENGENFELDER, Erich WOLF, Wolfgang GOTTFRIED**

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1.  This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2.  This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3.  This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4.  A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5.  A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
  - a.  is transmitted herewith (required only if not transmitted by the International Bureau).
  - b.  has been transmitted by the International Bureau.
  - c.  is not required, as the application was filed in the United States Receiving Office (RO/US).
6.  A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7.  A copy of the International Search Report (PCT/ISA/210).
8.  Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
  - a.  are transmitted herewith (required only if not transmitted by the International Bureau).
  - b.  have been transmitted by the International Bureau.
  - c.  have not been made; however, the time limit for making such amendments has NOT expired.
  - d.  have not been made and will not be made.
9.  A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10.  An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11.  A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12.  A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

**Items 13 to 18 below concern document(s) or information included:**

13.  An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14.  An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15.  A **FIRST** preliminary amendment.  
A **SECOND** or **SUBSEQUENT** preliminary amendment.
16.  A substitute specification.
17.  A change of power of attorney and/or address letter.
18.  Certificate of Mailing by Express Mail
19.  Other items or information:

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR <b>09/831862</b>	INTERNATIONAL APPLICATION NO. PCT/DE 00/02635	ATTORNEY'S DOCKET NUMBER <b>1604</b>
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20. The following fees are submitted:

**BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :**

<input type="checkbox"/> Search Report has been prepared by the EPO or JPO .....	\$930.00
<input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) .....	\$720.00
<input type="checkbox"/> No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) .....	\$790.00
<input checked="" type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO .....	\$1,070.00
<input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) .....	\$98.00

**CALCULATIONS PTO USE ONLY**

**ENTER APPROPRIATE BASIC FEE AMOUNT =**

Surcharge of **\$130.00** for furnishing the oath or declaration later than  20  30 months from the earliest claimed priority date (37 CFR 1.492 (e)).

**\$1,000.00**

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	9 - 20 =	0	x \$18.00	<b>\$0.00</b>
Independent claims	1 - 3 =	0	x \$80.00	<b>\$0.00</b>

Multiple Dependent Claims (check if applicable).  **\$0.00**

**TOTAL OF ABOVE CALCULATIONS =** **\$1,000.00**

Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) (check if applicable).  **\$0.00**

**SUBTOTAL =** **\$1,000.00**

Processing fee of **\$130.00** for furnishing the English translation later than  20  30 months from the earliest claimed priority date (37 CFR 1.492 (f)). + **\$0.00**

**TOTAL NATIONAL FEE =** **\$1,000.00**

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable).  **\$0.00**

**TOTAL FEES ENCLOSED =** **\$1,000.00**

	Amount to be: refunded	\$
	charged	\$

- A check in the amount of \_\_\_\_\_ to cover the above fees is enclosed.
- Please charge my Deposit Account No. **19-4675** in the amount of **\$1,000.00** to cover the above fees. A duplicate copy of this sheet is enclosed.
- The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **19-4675** A duplicate copy of this sheet is enclosed.

**NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.**

SEND ALL CORRESPONDENCE TO:

STRIKER, STRIKER & STENBY  
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HUNTINGTON, NEW YORK 11743

  
SIGNATURE

**MICHAEL J. STRIKER**

NAME

**27233**

REGISTRATION NUMBER

**MAY 15, 2001**

DATE

2 PPTS

09/831862  
JC18 Rec'd PCT/PTO 15 MAY 2001

Electrical Machine

Prior Art

The invention relates to an electrical machine, in particular a generator, according to the preamble to the independent claim.

WO 99/017430 has disclosed a generator with an annular gap seal. A spacer between a pulley and a roller bearing is disposed so that it produces an annular gap with a part fastened to the hub. This annular gap, however, has only a limited sealing action. This annular gap seal is only in a position to prevent the penetration of larger particles into the space between the spacer and the roller bearing. This limited sealing action results in the disadvantage that this annular gap seal does not have any sealing action with regard to fluids and smaller particles.

Advantages of the Invention

In the electrical machine according to the invention, with the characterizing features of the independent claim, it is possible to embody the annular gap seal so that it also has a sealing action with regard to fluids and smaller particles. The improved annular gap seal protects the roller bearing, which is already sealed by sealing disks and is therefore also protected from the damaging influence of fluids. This is particularly advantageous if the vehicle, which contains the electrical machine according to the invention, must have a so-called fording ability and

therefore must also be suitable for driving through flooded areas.

Advantageous modifications and improvements of the features disclosed in the independent claim are achieved by the steps taken in the dependent claims.

#### Drawings

The invention will be explained in detail below in an exemplary embodiment in conjunction with the accompanying drawings.

Fig. 1 is a longitudinal section through the electrical machine according to the invention, wherein the upper half of the drawing shows a sectional view of a rotor of the machine and the bottom half of the drawing shows a side view of the rotor;

Fig. 2 is a section through an annular gap seal according to the invention.

Identical components or components which have the same function are labeled with the same reference numerals.

#### Description of the Exemplary Embodiment

In the upper half of the drawing, Fig. 1 shows a longitudinal section through the electrical machine according to the invention. The electrical machine, in the structural form of a generator in this instance, has a cup-

shaped housing 10, which is closed by a housing cover 14. A stator 18 that encompasses a rotor 22 is fastened inside the cup-shaped housing 10. The rotor 22 is supported at one end by a bearing 26 in the housing bottom 30 and at the other end by a roller bearing 34 in the housing cover 14. The roller bearing 34 is supported with a shaft-side bearing ring 38 on a rotor shaft 42. On the side oriented toward the hub, the roller bearing 34 is supported in the housing cover 14 by means of a hub-side bearing ring 46. The housing cover 14 forms a hub 54 by means of a shoulder 50. The axial position of the shaft-side bearing ring 38 is defined by a shaft collar 57 to which the shaft-side bearing ring 38 is secured by a nut 60 by means of a collar 63 of a pulley 66 and a first component 69 disposed between the collar 63 and the bearing ring 38. The first component 69 is non-rotatably connected to the shaft 42. On the hub side, a covering cap 72 covers an electrical switch 75, which is disposed radially outside the shoulder 50. A second component 78 is fastened to the covering cap 72 and rests against the bearing ring 46 oriented toward the machine. The covering cap 72 and the second component 78 are both non-rotatably connected to the housing cover 14 and therefore to the hub 54. An annular gap 81 is formed between the shaft 42, or the first component 69 non-rotatably connected to the shaft 52, and the second component 78 non-rotatably connected to the hub 54.

Fig. 2 shows the annular gap 81 and its vicinity in detail. As is clear, the annular gap 81 is at least partially filled with a pasty material 84. In particular, this pasty material 84 is grease. The annular gap 81 is at least partially U-shaped. The U-shaped region 87 of the annular gap 81 has free leg ends 90, 91, which are directed

radially inward toward the shaft 42. The two free leg ends 90, 91 of the U-shaped region 87 are separated from each other by an annular disk-shaped collar 93. The annular disk-shaped collar 93 is formed onto and is of one piece with the first component 69 and thereby protrudes radially outward. The annular disk-shaped collar 93 thereby extends into a recess 96 of the hub 54 or the second component 78 connected to the covering cap. The hub 54 is supported on the roller bearing 34 so that it can rotate in relation to the shaft 42. The roller bearing 34 has a radially oriented sealing disk 99 which partially adjoins the U-shaped region 87 of the annular gap 81. It is favorable if the annular disk-shaped collar 93 is embodied on the first component 69 and that the first component 69 thereby serves as a spacer ring 102 for the shaft-side bearing ring 38 of the roller bearing 34. It is also favorable if the recess 96 is disposed in the covering cap 72 constituted by the second component 78.

If the electrical machine shown in Fig. 1 is driven by means of the pulley 66, then the annular disk-shaped collar 93 rotates in the recess 96 of the second component 78. If the pasty material 84, for example grease, is introduced into the annular gap 81 as described above, then the pasty material 84 is spun radially outward by the friction on the annular disk-shaped collar 93 and the rotating speed of the collar 93. This results in the fact that the pasty material 84 collects in the U-shaped region 87, particularly in the outer regions. Depending on how much material 84 is introduced into the annular gap 81, the U-shaped region 87 is more or less filled. With a maximal filling, both free legs of the U-shaped region 87 are filled. As a result, the connection between the roller bearing 34 and the outside is tightly closed. In order for the sealing action in the

filled annular gap 81 to be retained in the presence of water pressure, the pasty material 84 should be selected in such a way that on the one hand, it adheres well to both the second component 78 and the first component 69 and on the other hand, has good internal cohesion. A favorable balancing of these material properties has the advantage that at least at low pressures, water pressing against the annular gap seal cannot penetrate to the bearing side, behind the annular disk-shaped collar 93.

Claims

1. An electrical machine, in particular a generator, with a shaft (42), a hub (54), and an annular gap (81) which is formed between the shaft (42), or at least one first component (69) non-rotatably connected to the shaft (42), and the hub (54), or at least one second component (78) non-rotatably connected to the hub (54), characterized in that the annular gap (81) is at least partially filled with a pasty material (84), in particular grease.

2. The electrical machine according to claim 1, characterized in that the annular gap (81) is at least partially U-shaped and free leg ends (90, 91) of a U-shaped region (87) of the annular gap (81) are directed radially inward.

3. The electrical machine according to claim 2, characterized in that the first component (69) has a radially outward protruding, annular disk-shaped collar (93) which separates the free leg ends (90, 91) from each other.

4. The electrical machine according to claim 3, characterized in that the collar (93) engages in a recess (96) of the hub (54) or engages the at least one second component (78).

5. The electrical machine according to claim 4, characterized in that the hub (54) is supported so that it can rotate in relation to the shaft (42) by means of a roller bearing (34), wherein the roller bearing (34) has at least one sealing disk (99), which is oriented radially.

6. The electrical machine according to claim 5,  
characterized in that the collar (93) is embodied on the  
first component (69), which serves as a spacer ring (102)  
for a shaft-side bearing ring (38) of the roller bearing  
(34).

7. The electrical machine according to claim 6,  
characterized in that the recess (96) is disposed in a  
covering cap (72) constituted by the second component (78).

8. The electrical machine according to claim 7,  
characterized in that the U-shaped region (87) of the  
annular gap (81) is at least partially adjoined by the  
sealing disk (99).

9. The electrical machine according to claim 8,  
characterized in that the covering cap (72) serves to  
axially secure a hub-side bearing ring (46) of the roller  
bearing (34).

## Abstract

An electrical machine, in particular a generator, is proposed, which has a shaft (42), a hub (54), and an annular gap (81). The annular gap (81) is formed between the shaft (42), or at least one first component (69) non-rotatably connected to the shaft (42), and the hub (54), or at least one second component (78) non-rotatably connected to the hub (54). The annular gap (81) is at least partially filled with a pasty material (84), in particular grease.

(Fig. 2)

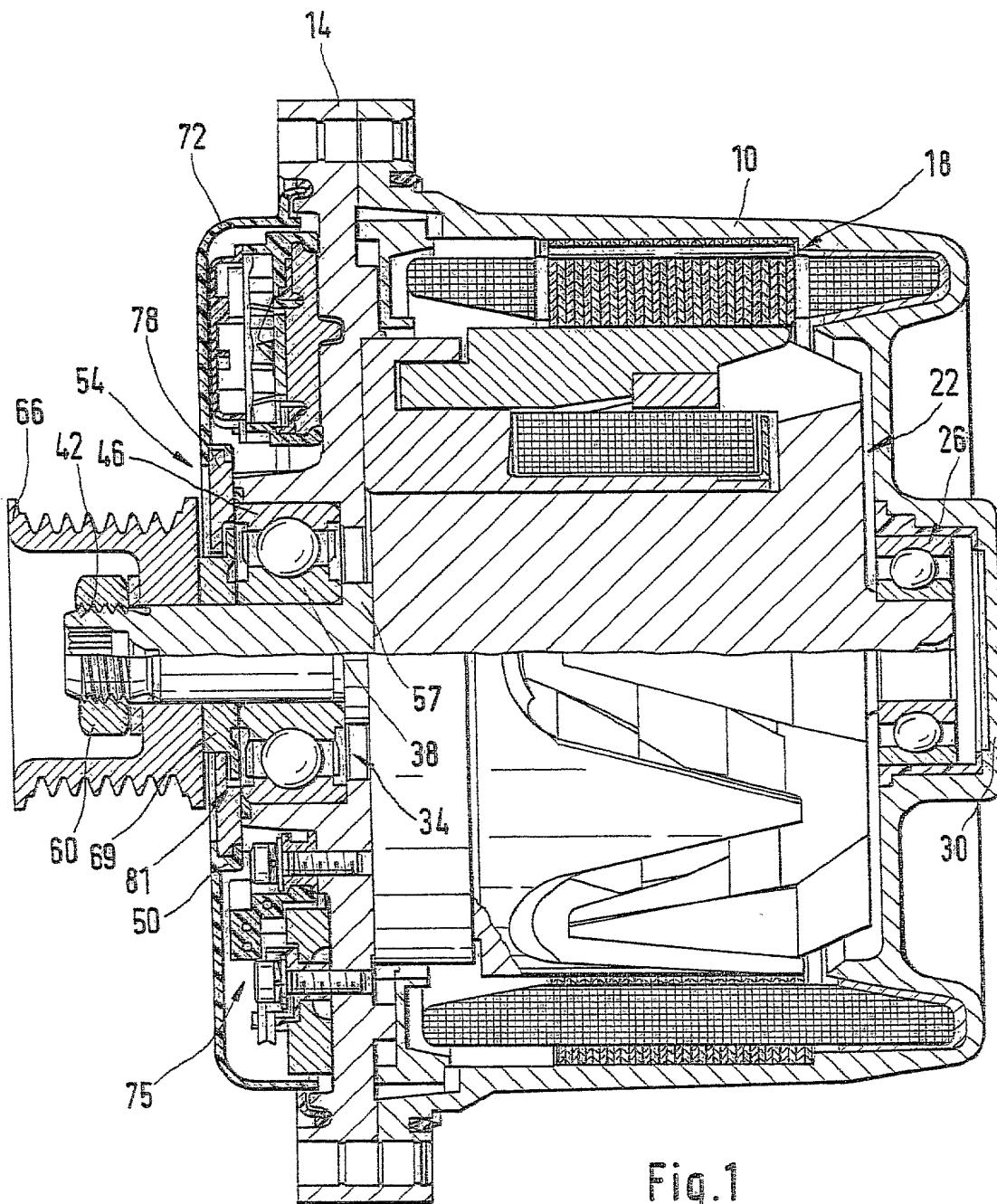
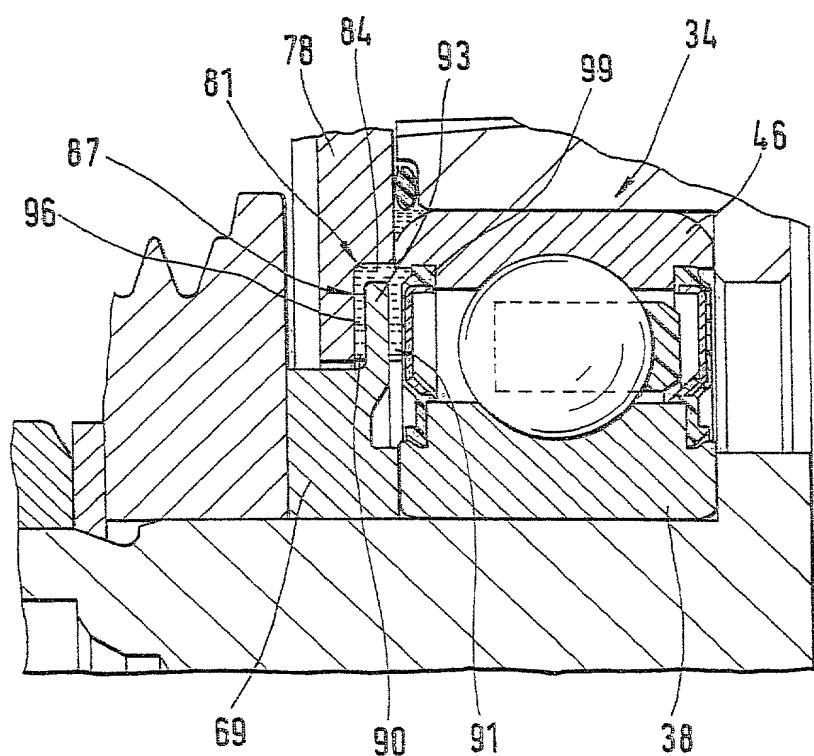


Fig. 1

Fig.2



R 36351

**DECLARATION AND POWER OF ATTORNEY FOR NATIONAL STAGE OF PCT PATENT APPLICATION**

As a below-named inventor, I hereby declare that:

Gerhard PFLUEGER  
Thomas LENGENFELDER  
Erich WOLF  
Wolfgang GOTTFRIED

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled **ELECTRICAL MACHINE** the specification of which was filed as PCT International Application number PCT/DE 00/02635 on August 8, 2000.

I hereby state that I believe the named inventor or inventors in this Declaration to be the original and first inventor or inventors of the subject matter which is claimed and for which a patent is sought.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose all information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365 (b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior foreign application(s):

Priority claimed:

199 44 557.5 (Number)	GERMANY (Country)	SEPTEMBER 17, 1999 (Date filed)	X Yes	No
(Number)	(Country)	(Date filed)	Yes	No

As a named inventor, I hereby appoint the following attorney to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

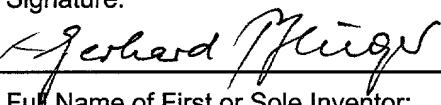
  
Michael J. Striker, Reg. No. 27233

Direct all telephone calls to Striker, Striker & Stenby at telephone no.: (631) 549 4700 and address and all correspondence to:

STRIKER, STRIKER & STENBY  
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment,

or both, under Section 1001 of Title 18 of the United States Code and that such wilful false statement may jeopardize the validity of the application or any patent issued thereon.

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